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UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Electrification Administration
Technical Standards Committees
(Electric)

Supplement No. 1, October 1982, to
~~REA~~ Bulletin 43-5
LIST OF MATERIALS ACCEPTABLE FOR USE ON
SYSTEMS OF REA ELECTRIFICATION BORROWERS

The attached pages for the "List of Materials Acceptable for Use on Systems of REA Electrification Borrowers" are those which have been revised by action of the Technical Standards Committees during the months of July through September 1982. The following changes should be made in order to keep it up to date. Pages with a colon between are on the same sheet, both being changed.

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| cp | cp | | |
| ei | ei | | |
| fj, fk, fl | fj, fk, fl | | |
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| U an-1.1 | U an-1.1 | | |
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PRODUCTION & DISTRIBUTION
CURRENT SERIAL RECORDS

c - Bolt, machine

Applicable Specifications: Edison Electric Institute Specification TDJ-1 1969, "Specifications for Steel Bolts and Nuts"

Applicable Sizes : 1/2 inch diameter, 6 through 10 inch length
5/8 inch diameter, 6 through 24 inch length
3/4 inch diameter, 6 through 26 inch length
7/8 inch diameter, 6 through 28 inch length

The following manufacturers have shown compliance with the applicable specifications for machine bolts:

A. B. Chance Company
Dixie Electrical Manufacturing Company

Hughes Brothers
*Joslyn Manufacturing and Supply Company
Kortick Manufacturing Company
*McGraw-Edison

Utilities Service Company



*"Static proof" design available.

d
October 1982

d - Washers

Flat Steel

| Size, inches: | 2 1/4 x 2 1/4 | 3 x 3 | 4 x 4 | 4 x 4 | 1-3/8 round | 1-3/4 round |
|---------------------|---------------|--------|--------|-------------|-------------|-------------|
| Thickness, in.: | 3/16 | 1/4 | 3/16 | 1/2 | 12 gauge | 10 gauge |
| Hole Diam., in.: | 13/16 | 13/16 | 13/16 | 13/16 | 9/16 | 11/16 |
| Chance | 6814 | 6817 | 6818 | 6819 1/2 | 6803 | 6805 |
| Dixie | D6814 | D6817 | D6818 | D6819 1/2 | D6803 | - |
| Hughes | SW2 1/4-70 | SW3-70 | SW4-70 | SW4-70(1/2) | RW1-3/8-50 | - |
| Joslyn | J1076 | J22596 | J1080 | J1473 | J1086 | - |
| Kortick | K1553 | K1555 | K1557 | K1559 1/2 | K1524 | K1525 |
| McGraw-Edison | DF2W5 | DF2W7 | DF2W10 | DF2W15 | DF1W2 | DF1W3 |
| Power Line Hardware | SWF-225A | | | | | |
| Utilities Serv. | 5485 | 5487A | 5488 | 5490A | 5478 | 5479 |

| Size, inches: | 2 1/4 x 2 1/4 | 3 x 3 | 3 x 4 | 4 x 4 | 3 round |
|-----------------------------------|-------------------|--------------|----------|----------|--------------------|
| Thickness, in.: | 1/4 | 5/16 | 7/16 | 1/2 | 3/16 |
| Hole Diam., in.: | 11/16 | 11/16 | 15/16 | 13/16 | 13/16 (spurred) |
| Barron Bethea (Nodular Iron) | GCW-1A* BB-214 | GCW-31* - | CRW-4A* | GCW-41* | - |
| Bethea/National (Aluminum Alloy) | - | WC-33-5* | WC-34-7* | WC-44-6* | - |
| Continental (Nodular Iron) | - | CW-33-5* | CW-34-7* | CW-44-6* | TCSF-30-6 |
| Flagg (MIF) (Malleable Iron) | P141* P56A | P143* | P120* | P144* | PX159A |
| Joslyn (Steel) | - | J114* | - | - | - |
| Lapp (Line Ware) (Malleable Iron) | 304075* | 304078* | - | 304082* | - |
| | 304089 | | | | |
| Power Line Hardware | | CSW-33* | CRW-34* | CSW-44* | |

* Curved

1 - Deadend for Steel Strand (Overhead Ground Wire)

TRANSMISSION

For High Strength Steel Strand and Aluminum-Clad Steel Strand

Clamp Type

| <u>High Strength Steel</u> | <u>Aluminum-Clad Steel</u> |
|----------------------------|--|
| <u>Manufacturer</u> | <u>3/8" and 7/16"</u> |
| | <u>7 No. 9 AWG 7 No. 8 AWG 7 No. 7 AWG</u> |
| Anderson/Sq. D | SWDE-55N |
| Bethea/National | FD-550-N (For use on 3/8" steel strand only) |
| Ohio Brass | 80437 |

1 - Deadend for steel strand (overhead ground wire)

TRANSMISSION

For high strength, extra high strength steel strand and aluminum clad steel strand

Compression Type

| <u>Manufacturer</u> | <u>High strength steel</u> <u>7/8"</u> | <u>7/16"</u> | <u>Aluminum-clad steel</u> <u>7 No. 9 AWG</u> | <u>7 No. 8 AWG</u> | <u>7 No. 7 AWG</u> | <u>Extra High Strength</u> <u>5/16"</u> | <u>3/8"</u> | <u>7/16"</u> |
|---------------------|---|--------------|--|--------------------|--------------------|--|-------------|--------------|
| Fargo | 82S712 | 82S714 | 82A79 | 82A78 | 82A77 | 82S710 | 82S712 | 82S714 |
| Alcoa | 4620.12 | 4627.14 | | | | | | |
| Burndy | YTW375E | YTW438E | YTW7M9T | YTW7M8T | YTW7M7T | | | |
| Somerset | Order by wire size and type. | | | | | | | |

Somerset

Order by wire size
and type.

Formed Type

| | | | | |
|--------------------|------------|-------------|-----------|-----------|
| Chance | 16M | AWSBG | 20M | AWSBG |
| Helical Line Prod. | HG211-7/16 | HG523-12.5M | HG525-16M | HG528-20M |

HG211-7/16 HG523-12.5M HG525-16M HG528-20M HG209-5/16 HG210-3/8 HG211-7/16

Automatic Type

| | | | | | | | |
|----------|---------|---------|---------|---------|---------|---------|---------|
| Fargo | GDE-302 | GDE-303 | GDE-302 | GDE-303 | GDE-301 | GDE-302 | GDE-303 |
| Reliable | 5202 | 5203 | 5202 | 5202 | 5203 | | |

p - Connectors, Distribution (Parallel Groove)

Applicable Specification: "REA Specification for Connectors," DT-8

ACSR to Copper or Copperweld-Copper

ACSR Size (Bare Conductor)

| | 3/0 | 2/0 | 1/0 | 2 | 4 |
|----------------|---------|---------|---------|---------|---------|
| Alcoa | 197 | R193 | R193 | 195 | 195 |
| Anderson/Sq. D | LC-811A | LC-811A | LC-522A | LC-511A | LC-511A |
| Blackburn | PAC7 | PAC7 | PAC4 | 2CA | 4CA |
| Fargo | GA-616C | GA-616C | GA-620C | GA-620C | GA-620C |
| Joslyn | 600ALC | 555ALC | 438ALC | 438ALC | 438ALC |
| Reliable | 600ALC | 555ALC | 438ALC | 438ALC | 438ALC |
| Weaver | - | - | - | 2WCA | 2WCA |

ACSR Size (Over Armor Rods)

| | 3/0 | 2/0 | 1/0 | 2 | 4 |
|----------------|----------|----------|---------|---------|---------|
| Alcoa | 201 | R197 | R197 | R197 | 199 |
| Anderson/Sq. D | LC-833 | LC-833 | LC-811A | LC-811A | LC-811 |
| Blackburn | - | - | PAC7 | PAC7 | PAC7 |
| Fargo | GA-9843C | GA-9842C | GA-616C | GA-616C | GA-616C |
| Joslyn | - | - | 744ALC | 600ALC | 600ALC |
| Reliable | - | - | 744ALC | 600ALC | 600ALC |

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p - Connectors, Distribution

Applicable Specification: "REA Specification for Connectors," DT-8

Copper Type Conductors
Connections to same size or smaller

| Welded Copper | 2A 0x7 | 4A 2x3 | 6A 4 | 8A 6 |
|---------------|-----------|-----------|---------|---------|
|---------------|-----------|-----------|---------|---------|

Bare Conductor

| | | | | | |
|------------------------|----------|----------|---------|---------|---------|
| Anderson/Sq. D | DG-1/0 | DG-1 | DG-2 | DG-4 | DG-6 |
| (s) Blackburn | RT11 | RT02 | RT02 | RT04 | RT06 |
| (s) Burndy | KS-25 | KS-23 | KS-23 | KS-20 | KS-17 |
| (s) Dossert | DS-10-F | DS-6-F | DS-6-F | DS-3-F | DS-2-F |
| (s) Fargo | GC-5020 | GC-5002S | GC-5002 | GC-5004 | GC-5006 |
| (s) Frankel | B-1/0 | B-2 | B-3 | B-4 | B-6 |
| (s) Greaves | - | A-8 | - | A-5 | A-3 |
| (s) ILSCO | IK-1/0 | IK-2 | IK-2 | IK-4 | IK-6 |
| (s) Joslyn | - | IF | 2F | 4F | 6F |
| (s) Kearney | 118109 | 118109 | 118108 | 118104 | 118102 |
| (s) Krueger & Hudepohl | UC58C-EV | - | - | - | - |
| (s) Penn-Union | S1/0 | S2 | S3 | S4 | S6 |
| (s) Reliable | - | 1F | 2F | 4F | 6F |
| (s) Royal Elec. Mfg. | 1739 | 1739 | - | - | - |
| (s) Sherman | TS1/0 | TS2ST | TS-2 | TS-4 | TS-6 |
| (s) Weaver | 10W | 1W | 2W | 4W | 6W |

Over Armor Rods

| | | | | | |
|----------------|---------|---------|---------|----------|---------|
| Anderson/Sq. D | K-5 | K-4 | K-4 | K-2 | K-2 |
| Blackburn | 2B350 | 2B350 | 2B4/0 | 2B2/0 | 2B1/0 |
| Burndy | KVS-31 | KVS-31 | KVS28 | KVS26 | KVS26 |
| Fargo | GC-5035 | GC-5035 | GC-5040 | GC-5020S | GC-5020 |
| ILSCO | IKB-350 | IKB-350 | IKB-4/0 | - | - |
| (s) Kearney | 118112 | 118112 | 118111 | 118110 | 118110 |
| Penn-Union | VT-4 | VT-3 | VT-3 | VT-2 | VT-1 |
| Weaver | 350CX | 350CX | 4/0CX | 2/0CX | 1/0CX |

(s) designates split bolt connectors

Long Connectors (Split Bolt)
Copper to Copper

| | <u>2</u> C-2-L | <u>4</u> C-4-L | <u>6</u> C-6-L |
|----------------|-------------------|-------------------|-------------------|
| Anderson/Sq. D | | | |
| Blackburn | 2H3 | 4H3 | 6H3 |
| Burndy | KS-22-3 | KS-20-3 | KS-17-3 |
| Dossert | DS5-3 | DS3-3 | DS2-3 |
| Greaves | A-9 | A-6 | A-4 |
| Joslyn | - | 4-F | 6-F |
| Kearney | 118107 | 118105 | 118103 |
| Penn-Union | SEL-3 | SEL-4 | SEL-4 |
| Reliable | - | 4F | 6F |
| Sherman | - | TSS-4 | TSS-6 |
| Weaver | 2W3 | 4W3 | 6W3 |

p - Connectors, Transmission

Bolted Type

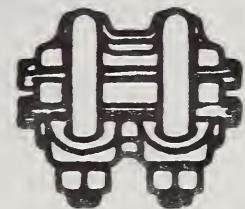
Applicable Specification: "REA Specification for Connectors," DT-8

ACSR to ACSR
ACSR to Copper

Alcoa 580 Series

Blackburn 2U Series

Burndy (ACSR to ACSR) UP-A, UP-R



When ordering these clamps specify size, stranding and material of both conductors.

Compression Type

ACSR to ACSR
Same Size



| <u>Conductor Size</u> | <u>Alcoa</u> | <u>Anderson</u> | <u>Burndy</u> | <u>Kearney</u> | <u>ITT Blackburn</u> |
|---------------------------|----------------------------|-----------------|---------------|----------------|--------------------------|
| 1/0 | 5074.438 | VCJS-50R | YCS25R | OHR-1/0-61AJ | RCJ10 |
| 2/0 | 5074.484 | VCJS-50R | YCS26R | OHR-2/0-61AJ | RCJ20 |
| 3/0 | 5075.547 | VCJS-61R | YCS27R | OHR-3/0-61AJ | RCJ30 |
| 4/0 | 5075.609 | VCJS-61R | YCS28R | OHR-4/0-61AJ | RCJ40 |
| 266.8 kcmil | 5076 Order by stranding | VCJS-80R | YCS30R | HR-266-267AJ | RCJ266M |
| 336.4 kcmil | 5076 stranding | VCJS-80R | YCS33R | HR-336-267AJ | RCJ336M |

ACSR to Copper

Alcoa 5070 Series
Anderson/Sq. D VCJS
Burndy YCR-R-CA

(Order by conductor sizes)

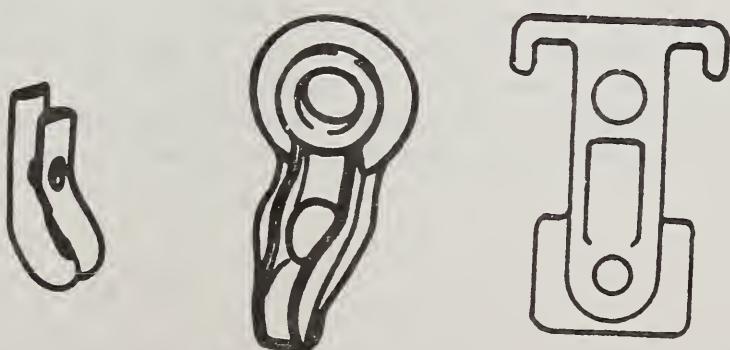
p - Connectors

(Wedge Type)

| <u>Manufacturer</u> | <u>Aluminum to aluminum</u> | <u>Aluminum to copper</u> | <u>Copper to copper</u> | <u>Tap connections (Al to Al, Al to Cu)</u> |
|---------------------|---------------------------------|-------------------------------|-----------------------------|---|
| AMP | "Ampact" (Aluminum) | "Ampact" (Aluminum) | "Ampact" (Copper) | "Ampact" (Aluminum) |
| UTM | "Wrench-Lok" | "Wrench-Lok" | -- | "Wrench-Lok" |

v - Guy attachment
for 5/8" bolt

| <u>Type:</u> | <u>Formed Strap</u> | <u>Angle Bolt Eye</u> | <u>Guy Hook</u> | <u>Pole Eye Plate</u> |
|------------------------------------|---------------------------------|----------------------------------|---------------------------------|---------------------------------|
| <u>Maximum Working Load Rating</u> | <u>23,130 N (5200 lbs.)</u> | <u>23, 130 N (5200 lbs.)</u> | <u>23,130 N (5200 lbs.)</u> | <u>37,800 N (8500 lbs.)</u> |
| Anderson Elec./ Square D | - | - | - | GSP-05 |
| Barron Bethea | - | - | GH-5* | - |
| Bethea/National | - | - | AG-5* | PE5-6A |
| Chance | 5004 | 0100 | C203-0168* | - |
| Continental Elec. | - | - | GA-54* | PEP-66-45 |
| Dixie | D5004 | D0100 | DD-9460, DD9462* | - |
| Flagg (MIF) | - | - | P135A, P151X* | PX88 |
| Joslyn | J25164 | J6500 | J6555, J6556 | - |
| Kortick | K4035, K4047 | K3140 | - | - |
| Lapp (Line Ware) | - | - | 304014* | 304021 |
| McGraw-Edison | DG6H1 | DG11E1 | DG21H1 DG21H2 | - |
| Power Line Hardware | - | - | HGA-58C* | PGA-548 |
| Util. Service | 31030 | 5531 | - | - |



*This hook may also be used in place of the wrapped guy arrangement in assemblies E3-2 and E3-3.

Conditional List

v
July 1982

v - Guy attachment

| <u>Manufacturer</u> | <u>Meeting No.</u> <u>and Date</u> | <u>Conditions</u> |
|--|---------------------------------------|--|
| <u>Joslyn</u> Pole band, with cone head bolt J-6281 and guy clip J-6275 J-6280(for 6" to 10" pole) J-6270(for 8" to 14" pole) | 745 8/16/62 | To obtain experience. For distribution line only and 10,000 lbs. maximum loading. |

ae - Surge Arresters, Substation*
(Lightning Arresters)

| <u>Manufacturer</u> | <u>Type</u> | <u>Accepted Ratings - kV</u> | <u>Manufacturer's Classification</u> |
|---------------------|-------------|------------------------------|--------------------------------------|
| General Electric | Alugard | 3, 9, 10, 18 | Distribution |
| Joslyn | 2RS | 9/10, 18 | Distribution |
| | Q | 3, 9/10, 18 | Distribution |
| Kearney | Unigap | 3, 9, 10, 18 | Distribution |
| McGraw-Edison | ES | 3, 9/10, 18 | Distribution |
| | F3 | 9-120 | Intermediate |
| | G | 3-144 | Station |
| Ohio Brass | GP | 3-72 | Intermediate |
| | MPA | 3-15 | Station |
| | MP | 3-48 | Station |
| | MPR | 60-312 | Station |
| | DA | 3, 9, 10, 18 | Distribution |
| Westinghouse | LV | 3-20 | Distribution |
| | IVL | 3-120 | Intermediate |
| | CPL | 3-312 | Station |

*For instructions concerning application at substations refer to REA Bulletin 65-1, "Guide for the Design of Substations for Electric Borrowers." In the purchase of arresters, care should be taken to select the type and voltage rating in accordance with the line voltage and the type of construction (grounded or ungrounded).

Conditional List

ae

October 1982

ae - Surge Arrester, Substation*

| <u>Manufacturer</u> | <u>Meeting No.</u> <u>and Date</u> | <u>Conditions</u> |
|--|---------------------------------------|----------------------|
| <u>General Electric</u> | | |
| Surge arrester, station class, metal oxide type, Tranquell, 2.7 kV thru 588 kV | 1164 5/24/79 | To obtain experience |
| Surge arrester, intermediate class, metal oxide type, Tranquell, 3 kV thru 120 kV | 1197 10/9/80 | To obtain experience |
| <u>Ohio Brass</u> | | |
| Surge arrester, station class, metal oxide type, Dynavar, 3 kV thru 357 kV | 1175 11/2/79 1239 7/29/82 | To obtain experience |
| Surge arrester, intermediate class, metal oxide type, Dynavar, 3 kV thru 120 kV | 1242 9/9/82 | To obtain experience |
| <u>McGraw-Edison</u> | | |
| Surge arrester, station class, metal oxide type VariSTAR 3 kV thru 192 kV Type ATZ1A | 1223 11/19/81 | To obtain experience |

*For instructions concerning application at substation refer to REA Bulletin 65-1, "Guide for the Design of Substations for Electric Borrowers." In the purchase of arresters, care should be taken to select the type and voltage rating in accordance with the line voltage and the type of construction (grounded or ungrounded).

^{aw}
July 1982

aw - Washer, Spring

$\frac{1}{4} \times 1\frac{3}{4}'' \times 3\frac{1}{2}''$

| <u>Manufacturer</u> | <u>Bolt Size</u> | | |
|----------------------------|------------------|-------------|-------------|
| | <u>5/8"</u> | <u>3/4"</u> | <u>7/8"</u> |
| Chance | 3540 | 3541 | - |
| Joslyn | J3540 | J3541 | J3542 |
| Kortick | K2909 | - | - |
| Fastex (ITW) "Ramp Lok" | 1-760-21 | 1-760-31 | 1-760-41 |
| McGraw-Edison | DF17W3 | DF17W4 | DF17W5 |

ax - Cutout and Arrester, Combination

| Nominal System Voltage Cutout Max. Voltage Rating | For 12.5Y/7.2 kV 7.8 kV | | For 13.2Y/7.6 kV 15 kV | | For 24.9Y/14.4 kV 18 kV | |
|--|--------------------------------|------------------------------------|--|--------------------------------------|--|------------------------------------|
| | 3Ø Trans. | 1Ø Sect. 100 | 3Ø Bank 3Ø Sect. 100 | 1Ø Trans. 50* | 3Ø Sect. 100 | 1Ø Sect. 50* |
| Application | 1Ø Trans. | 1Ø Sect. 100 | 3Ø Bank 3Ø Sect. 100 | 1Ø Trans. 50* | 3Ø Sect. 100 | 1Ø Sect. 100 |
| Cutout Current Rating Type | 50* | | | | | |
| Manufacturer | Mounting | | | | | |
| Chance | Crossarm Transformer | C71A-112PB Series | C71A-112PB Series | C71A-112PB Series | C71A-112PB Series | C70J-2L73 Series |
| General Electric | Crossarm (L) Transformer | 9F80 | 9F80 | 9F80 | 9F80 | 9F80 |
| Joslyn (valve) (valve) (valve) | Crossarm (L) Transformer | J9237-Q6 J9237-Q2/B J9238-1Q | J9237-Q2/R J9237-Q2/B/R J9238-1Q | J9237-Q6 J9237-Q2/B/R J9238-1Q | J9237-Q2/R J9237-Q2/B/R J9268-1Q | J9267-Q2 J9267-Q2/B J9268-1Q |
| Kearney | Crossarm Transformer | 294072 | 123511 | 294073 | 123512 | 123514 |
| McGraw-Edison | Crossarm (L) Transformer | AFS800M010 | AFS301B Series | AFS301C Series | AFS301C Series | AFS300D Series |

Either normal duty or heavy duty distribution class arresters listed on page ae-1 are acceptable for use with these combination units.

*These cutouts have open links and must not be used where fault currents are high or for sectionalizing.

(L) Indicates loadbreak type is available.

Conditional List
be(4)
October 1982

be - Reclosers, vacuum interrupter

| <u>Manufacturer</u> | <u>Meeting No. and Date</u> | <u>Conditions</u> |
|---|------------------------------------|--------------------------|
| <u>*McGraw-Edison</u> (Cont.) Three-phase type VWV rated 560 amperes continuous, maximum voltage 27 kV for 14.4/24.9 kV | 1021 7/19/73 | To obtain experience. |
| <u>Westinghouse</u> Three-phase Type ESV rated 800 amperes continuous, maximum voltage 38 kV for 24.9/14.4 kV | 1117 6/23/77 1239 7/29/82 | To obtain experience. |

*Ratings greater than 100 amp. for 7.2/12.5 kV application, and greater than 200 amp. for 14.4/24.9 kV application, are acceptable only with ground trip devices.

bh
July 1982

bh - Clevis, Service Deadend

Applicable Specification: "REA Specification for Service Deadend Clevises," D-8

| <u>Manufacturer</u> | <u>Clevis Only*</u> | <u>Clevis with dry process spool</u> | <u>Clevis with wet process spool</u> |
|---------------------|---------------------|--------------------------------------|--------------------------------------|
| Chance | 0341 | 0341-0606 | 0341-C909-1931 |
| Dixie | D0341 | D0341-D | D0341-W |
| Joslyn | J0313 | J0314 | - |
| Kortick | K9250 | K9100 | K9099 |
| McGraw-Edison | DC3F1 | - | - |
| Utilities Service | 32136 | 31136 | 36136 |

*Catalog number does not include spool; for spool see Page cm.

cg - Switch, air, three-pole, group-operated
NEMA standard switches for station and line structures

| <u>Manufacturer</u> | <u>Mounting on Structure</u> | <u>Tilting Ins. Type</u> | <u>Vertical Break Type</u> | <u>Side Break Type</u> | <u>Center Break Type</u> | <u>Double Break Type</u> |
|--------------------------|--------------------------------------|--------------------------|----------------------------|----------------------------------|---|--------------------------|
| | | | kV | kV | kV | kV |
| Brown Boveri Elec. (ITE) | Horizontal | 3ST 15-34.5 | TTR6 | 15-161 | D2,D3(L)15-34.5 D2,D3(L)15-34.5 D2,D3(L)15-34.5 | |
| A. B. Chance | Horizontal Phase over Phase Vertical | | | | | |
| Johnson | Horizontal | | VIP | 15-230 | LS | 15-69 M |
| Joslyn (Hi-Voltage) | Horizontal Horizontal | | RF-2(VL)15-230 | RB-1(VL)15-25 RB-1* 15-115 | | |
| Kearney | Horizontal | NE-2 15-34.5 | AR 60-P | 15-69 | EE | 69-230 |
| MEMCO | Horizontal | AgF 15-69 AgC 15-69 | EA | 15-345 | | |
| G & W Electric Company | Horizontal | | MK-40 | 15-69 | PMB-40A 15-69 LPC | 69-230 |
| Powerdyne (Kearney) | Horizontal Phase over Phase | | | V2-V4 15-230 V2 15-23 | | |
| ANIXTER Royal | Phase over Phase Horizontal | | | RG-63(L) 15-69 RSL-L(L) 15-69 | | |

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

* These switches may be purchased with reduced voltage vacuum interrupters and may be applied for loop sectionalizing duty when peak recovery voltage does not exceed 25 kV.

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg-1
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cg - Switch, air, three-pole, group-operated
NEMA standard switches for station and line structures

| <u>Acceptable Mounting on Structures</u> | <u>Tilting Ins. Type</u> | <u>Vertical Break Type</u> | <u>Side Break Type</u> | <u>Center Break Type</u> | <u>Double Break Type</u> |
|--|------------------------------|--------------------------------|----------------------------|------------------------------|------------------------------|
| S & C | Horizontal | Alduti(L)15-34.5 | Alduti(L)15-25 | Alduti(L)34.5-46 | |
| | Phase over Phase | Alduti(L)15-25 | Alduti(L)15-25 | Alduti(L)34.5-46 | |
| | Vertical | Alduti(L)*15-34.5 | Alduti(L) 15-25 | Alduti(L)*34.5-46 | |
| SEECO | Phase over Phase | | GOABS(VL)15-69 | | |
| | Horizontal | H1 | 15-230 | S | 15-69 |
| Siemens-Allis | Horizontal | | SSB-T | 15-69 | CCB 115-230 |
| | | TA(VL) | 15-69 | | CBL-2 115-230 |
| Southern States | Horizontal | | WAG | 15-230 | 57K |
| | Phase over Phase | | | (1D,2D,3D)(VL) | 15-161 |
| | Horizontal | | | 1D(VL) | 15-161 |
| Turner | Horizontal | | AGT(VL)**15-230 | GSH-4(VL)15-138 | AGCH** 15-345 |
| | Horizontal | | | | AGCH-V**34.5-230 |
| | Phase over Phase | | | GSH-4(VL)15-138 | GCH 15-23 |
| USCO | Horizontal | | | | |
| | Horizontal | | | | |
| | Phase over Phase | | | | |

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

* These switches, except 34.5 kV Alduti vertical break, are available and accepted in combination with the S & C Type SMD substation fuse cutouts listed on page af-3.

**Also available in bronze in some ratings.

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

Conditional List
cg(1)
October 1982

cg - Switch, air, three-pole, group-operated

| <u>Manufacturer</u> | <u>Meeting No. and Date</u> | <u>Conditions</u> |
|--|---------------------------------|--|
| <u>Southern States</u> | | |
| "Pole-Pak" 15-23 kV | 800 8/20/64 | To obtain experience. |
| Type EV, horizontal mounted, vertical break, 15-230 kV 600-1200 amp. | 859 2/9/67 | To obtain experience. |
| Type ES; 15, 23 and 34.5 kV (horizontal upright models only) | 897 7/11/68 | <ol style="list-style-type: none"> 1. To obtain experience. 2. For 15 kV and 23 kV distribution lines: insulated interphase and control rod spacers required. See REA Drawings M3-15 and VM3-16. 3. NEMA insulators and steel interphase base required for transmission line structure as in TM-3. 4. Acceptable on steel substations 15 through 34.5 kV with NEMA insulators and uninsulated interphase rods. |
| Type 57L sidebreak, 115-161 kV, 600 and 1200 amp., horizontal upright | 1067 6/12/75 | To obtain experience. |
| <u>G & W Electric Company</u> | | |
| Type MK-40A 15 kV thru 230 kV (horizontal upright mounting). | 912 2/20/69 | <ol style="list-style-type: none"> 1. To obtain experience. 2. Insulated interphase and control rods required on 15 kV and 23 kV models used on wood structures. 3. Steel interphase base required when mounted as in REA Drawing TM-3. |

Conditional List

cg(2)

October 1982

cg - Switch, air, three-pole, group-operated

| <u>Manufacturer</u> | <u>Meeting No. and Date</u> | <u>Conditions</u> |
|--|---|---|
| <u>G & W Electric Company (Cont'd)</u> | | |
| "Mark 40" | | |
| 115 kV thru 345 kV (horizontal upright mounting) | 1005 12/7/72 | To obtain experience. |
| Type LPV, 3-pole 72.5-272 kV, 1200 amp., 1600 amp., 2000 amp., center sidebreak for horizontal mounting | 1064 5/1/75 | To obtain experience. |
| <u>Siemens-Allis</u> | | |
| Type AVB(VL), 115-345 kV (Available in copper, 115- 138 kV, order Type CVB(VL)) (Horizontal upright mounting) | 1027(10/11/73) 1154(1/4/79) 1157(2/15/79) | To obtain experience. |
| Type CBL-T, 15-69 kV 600 and 1200 amp (center break, horizontal upright mounting) | 1100 10/21/76 | <ol style="list-style-type: none"> 1. To obtain experien 2. Insulated interphase and control rods required on 15 kV and 25 kV models used on wood structures. |
| <u>Morgan</u> | | |
| Type VBV(VL), horizontal upright | 1056 1/2/75 | <ol style="list-style-type: none"> 1. To obtain experience. 2. Pole mounted switches must be supplied with insulated interphase and control rods. (Same as above) |
| Pole top mtg., 15-34.5 kV | 1146 | |
| H-frame mtg., 46-230 kV | 8/31/78 | |
| Substation mtg., 15-230 kV | | |
| Type CVB, center side-break | 1056 | |
| Horizontal pole top mounting, 15-34.5 kV | 1/2/75 | |
| Phase-over-phase mounting, 15-23 kV | | |
| H-frame and substation mounting, 15-230 kV | | |

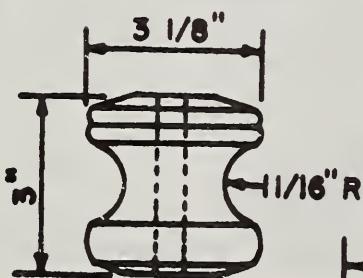
(L) Means full-load interrupter accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

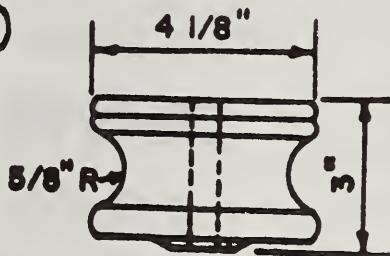
cm
July 1982

cm - Insulator, Spool

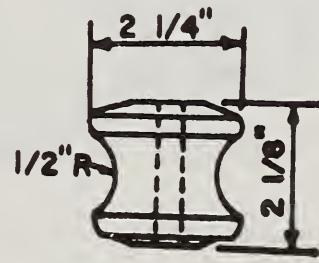
| Type: | <u>Secondary (Wet Process)</u> | | <u>Service</u> | |
|-----------------------------|--------------------------------|--------------------|----------------|---------------|
| | <u>Wet Process</u> | <u>Dry Process</u> | | |
| Groove Diameter: | <u>1-3/4"</u> | <u>3"</u> | <u>1-3/8"</u> | <u>1-3/8"</u> |
| Chance | C909-1032 | C909-1034 | C909-1031 | 0606 |
| Hughes | 2102 | - | - | - |
| Brown Boveri Elec. (ITE) | 2012 | 2026 | 2011 | - |
| Joslyn | J151 | J0101 | J150 | J100 |
| Kortick | K516 | K522 | K513 | K514 |
| McGraw-Edison | DE4S3 | DE5S1 | DE2S2 | DE2S1 |
| Porcelain Prod. (Knox) | 5101 | 5119 | 5107 | 5207 |
| Universal | 1082 | - | - | - |
| Utilities Service | 205 | 31221 | 208 | 207 |



1-3/4" Groove Diameter



3" Groove Diameter



1-3/8" Groove Diameter

cp
October 1982

cp - Deadend, Compression Type

ACSR

| <u>Conductor Size</u> | <u>Alcoa</u> | <u>Anderson/Sq. D</u> |
|-----------------------|--------------|-----------------------|
| 1/0 | Order by | VCD-50R |
| 2/0 | Conductor | thru |
| 3/0 | Size and | VCD-61R |
| 4/0 | Stranding | " |
| 266.8 kcmil 26/7 | 2-piece | VCD-831-1-RM |
| 336.4 kcmil 26/7 | alloy | VCD-831-1-RM |
| 477 kcmil 26/7 | compression | VCD-832-2-RM |
| 556.5 kcmil 26/7 | Type VES or | VCD-833-3-RM |
| 795 kcmil 26/7 | HES | VCD-835-4RM |
| 954 kcmil 54/7 | " | VCD-835-4RM |

| <u>Conductor Size</u> | <u>Burndy</u> | <u>Fargo</u> | <u>Kearney</u> | <u>Somerset/Homac</u> |
|-----------------------|---------------|--------------|----------------|-----------------------|
| 1/0 | Type Y-W | | 104000 | Order by |
| 2/0 | " | | thru | Conductor |
| 3/0 | " | | 104000-03 | Size and |
| 4/0 | " | | " | Stranding |
| 266.8 kcmil 26/7 | " | SEDA-1109 | 104000-05 | " |
| 336.4 kcmil 26/7 | Type YTW | SEDA-1309 | thru | " |
| 477 kcmil 26/7 | " | SEDA-1809 | 104000-14 | " |
| 556.5 kcmil 26/7 | " | SEDA-2209 | " | " |
| 795 kcmil 26/7 | " | SEDA-3309 | | . |
| 954 kcmil 54/7 | " | SEDA-4121 | | |

ACSR
Adjustable

Somerset/Homac Order by conductor size and stranding.

Aluminum Alloy
(6201 and 5005)

Conductor Size: 4 thru 4/0

Anderson/Sq. D Type VOD, Order by conductor size.

Copper

Conductor Size: 2 x 3 4 6

National Tel. Supply 71-258/3X 71-204-P 71-162-J

Copperweld-Copper

Conductor Size: 6A 8A

National Tel. Supply 71-6A-P 71-8A-P

ei - Clamps, suspension with socket eye

ACSR with Straight or Formed Armor Rods

| | AWG | 1/0 & 2/0 | 3/0 | 4/0 | 266.8 | 336.4 | 477 | kcmil | 556.5 | 795 | 954 |
|-----------------------------|----------|-----------|----------|----------|----------|----------|-----|----------|----------|----------|-----|
| <u>Iron or Steel Clamps</u> | | | | | | | | | | | |
| Anderson | MS-82-S | - | | MS-104-S | - | - | - | - | - | - | - |
| Barron Bethea | FGW-1S | - | | - | - | - | - | - | - | - | - |
| Bethea/National | FS-83-S | - | | - | - | - | - | - | - | - | - |
| Brown Boveri Electric (ITE) | 6203 | 6204 | 6204 | 6205 | 6255 | 6257 | - | SC-149-S | SC-177-S | SC-192-S | - |
| Continental | SC-85-S | SC-105-S | SC-105-S | SC-105-S | SC-119-S | SC-136-S | - | - | - | - | - |
| Joslyn | 6203 | 6204 | 6204 | 6205 | 6255 | 6257 | - | - | - | - | - |
| (Brewer-Titchener) | | | | | | | | | | | |
| Knox | 6203A-U | 6204A-U | 6204A-U | 6205A-U | 6255A-U | 6257A-U | - | - | - | - | - |
| Lapp | 30574,3S | - | - | - | - | - | - | - | - | - | - |
| Ohio Brass | 83085 | 83105 | 83105 | 83115 | 83125 | 83145 | - | - | - | - | - |

ACSR with Straight or Formed Armor Rods

| | AWG | 1/0 & 2/0 | 3/0 & 4/0 | Aluminum Alloy Clamp | 266.8 | 336.4 | 477 | kcmil | 556.5 | 795 | 954 |
|-----------------------------|-----------|-----------|-----------|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>Iron or Steel Clamps</u> | | | | | | | | | | | |
| Anderson | HAS-104-S | | HAS-104-S | HAS-118-S | HAS-139-S | HAS-147-S | HAS-182-S | HAS-182-S | HAS-182-S | HAS-182-S | HAS-182-S |
| Bethea/National | LS-1-S | LS-2-S | LS-2-S | LS-3-S | LS-4-S | LS-6-S | LS-7-S | LS-7-S | LS-8-S | LS-8-S | LS-8-S |
| C & R | CRSC-1S | CRSC-2S | CRSC-3S | CRSC-3S | - | - | - | - | - | - | - |
| Dulmison | - | AGS | AGS | AGS | AGS | AGS | AGS | AGS | AGS | AGS | AGS |
| Brown Boveri Electric (ITE) | 9503-U | 9504-U | 9505-U | 9505-U | 9506-U | 9506-U | - | - | - | - | - |
| Joslyn | 9503-S | 9504-S | 9505-S | 9505-S | 9506-S | 9506-S | - | - | - | - | - |
| (Brewer-Titchener) | | | | | | | | | | | |
| Knox | 9503-U | 9504-U | 9505-U | 9505-U | 9506-U | 9506-U | - | - | - | - | - |
| Lapp | 306029S | 306030S | 306031S | 306031S | 306032S | 306032S | - | - | - | - | - |
| Ohio Brass | 87085 | 87105 | 87115 | 87115 | 87135 | 87135 | - | - | - | - | - |
| *Preformed | - | AGS | AGS | AGS | AGS | AGS | AGS | AGS | AGS | AGS | AGS |

*Clevis type available.

ei
October 1982

ej - Clamps, deadend with socket eye

ej
July 1982

| | AWG 2/0 to 4/0 | 266.8 | 366.4 | 477 | kcmil 556.5 | 795 | 954 | | | | | | |
|---|-------------------|-----------|-----------|----------|----------------|------------|------------|--|--|--|--|--|--|
| | ACSR | | | | | | | | | | | | |
| <u>Iron or Steel Clamps (Require armor tape or liner)</u> | | | | | | | | | | | | | |
| <u>Aluminum Alloy Clamps (Do not require armor tape or liner)</u> | | | | | | | | | | | | | |
| Brown Boveri Electric (ITE) 5001 | 5002 | 5002 | 5003 | - | - | - | - | | | | | | |
| Joslyn (Brewer-Titchener) | 5001 | 5002 | 5002 | 5003 | - | - | - | | | | | | |
| Knox | 5001 | 5002-B | 5002-B | 5003 | - | - | - | | | | | | |
| Ohio Brass | 80440 | 80445 | 80445 | 80450 | - | - | - | | | | | | |
| Anderson/Square D | SD-57-S | SD-70-S | SD-86-S | SD-98S | - | - | - | | | | | | |
| Bethel/National 1 | ADE-21-S | ADE-22-S | ADE-23-S | ADE-24-S | ADE-2526-S | ADE-2526-S | ADE-2526-S | | | | | | |
| C & R | CR-10-60S | CR-20-60S | CR-20-60S | - | - | - | - | | | | | | |
| Brown Boveri Elec. (ITE) | 52001 | 52011 | 52021 | 52031 | - | - | - | | | | | | |
| Joslyn (Brewer-Titchener) | 5200 | 5201 | 5202 | 5203 | - | - | - | | | | | | |
| Knox | 5200 | 5201 | 5202 | 5203 | - | - | - | | | | | | |
| Lapp | 305757S | 305758S | 305759S | 305760S | - | - | - | | | | | | |
| Ohio Brass | 86536 | 86540 | 86546 | 86546 | - | - | - | | | | | | |

NOTE: When used with clevis-type insulators for large conductors on distribution lines, order clamp with clevis eye.

fi
July 1982

fi - Connectors, hot line

Over Armor Rods

| <u>Manufacturer</u> | <u>Catalog Number or Series (Al to Al)</u> | <u>Catalog Number or Series (Al to Cu)</u> |
|----------------------|--|--|
| Blackburn | PGH | - |
| Electrical Specialty | AHC-500 | AHC-500 GP |
| Fargo | GA-100 Series | GA-100C Series |

fj, fk, fl
October 1982

fj - Bracket, extension

(For use in mounting oil circuit reclosers or sectionalizers)
See Drawing VM3-10A

| | <u>Through Bolt Type</u> | <u>Band Type</u> |
|---------------|--------------------------|------------------|
| Aluma-Form | TBRSM-1, TB2M1-9* | RSM-1 |
| Dixie | D-2359-M | |
| Joslyn | J2357M | |
| McGraw-Edison | DR2E3 | |

*For mounting double lug reclosers.

fk - Bracket, oil circuit recloser or sectionalizer

(For cluster mounting of three oil circuit reclosers on pole)

| | |
|----------------|---------------|
| Aluma-Form | RSM-3, 6M3-9* |
| *McGraw-Edison | DT8C1 |
| Turner | 695-3 |

*Suitable for 14.4 and heavy duty 7.2 kV.

fl - Rack, primary metering

(For cluster mounting of primary metering equipment on pole)

| | |
|------------|------------|
| Aluma-Form | PMM Series |
| Turner | 3CT-PT |

gw-1
July 1982

gw - Crossarm Assembly for H-Frame Construction

Applicable Specification: REA Specification T-7, Revision dated November 1962

Applicable Drawing : TH-11B Series (161 kV maximum)
No braces (TH-11B)

Two vee braces on outside (TH-11BVO)
Two vee braces on inside (TH-11BVI)
Four vee braces (TH-11BV4)

3-5/8" x 9-3/8" x 33' wood crossarm assembly complete with attaching hardware, fittings, bolts and 3-3/8" x 5-3/8" braces.

Catalog Nos. or Drawing Nos.

| (Assemblies) | <u>TH-11B</u> | <u>TH-11BVO</u> | <u>TH-11BVI</u> | <u>TH-11BV4</u> |
|---------------------------------------|--------------------|---------------------------|---------------------------|---------------------------|
| | <u>Items</u> gw | <u>Items</u> gw and vo | <u>Items</u> gw and vi | <u>Items</u> gw and vv |
| American Crossarm and Conduit Co. (1) | 70250 | 7025VO | 7025VI | 7025V4 |
| Brooks Lumber (1,2) | 6411 | 6411-1 | 6411-2 | 6411-3 |
| Cascadian (1,2) | CCC11B72 | CCC11B72-VO | CCC11B72-VI | CCC11B72-V4 |
| Hughes Brothers (1,2) | C3316-B | C3316-B | C3316-B | C3316-B |

1 - Fixed spacer fitting sizes as required

2 - Adjustable spacers are available

gw-2
October 1982

gw - Crossarm Assembly for H-frame Construction
(Double Arm) 230 kV (Small Angle)

Applicable Specification: REA Specification T-8
Drawing : TH-231B

Assembly complete with attaching hardware, fittings, bolts and braces.

Crossarm 3-5/8" x 9-3/8"

| <u>Manufacturer</u> | <u>Catalog No.</u> |
|---------------------------------|--------------------|
| American Crossarm & Conduit (1) | 8026VB |
| Brooks (1,2) | 64231 |
| Cascadian (1,2) | CCC231B82 |
| Hughes (1,2) | C-3338-B |
| Koppers (1) | REA-230B |

Crossarm 5-1/8" x 7-1/2"

| | |
|-----------------|-----------|
| Brooks (1,2) | 64231L |
| Cascadian (1,2) | CCC231BT |
| Hughes (1,2) | C-3338-BL |

1 - Fixed spacer fitting sizes as required.
2 - Adjustable spacers are available.

gy-2
October 1982

gy - Crossarm Assembly for H-frame Construction
(Double Arm) 230 kV (Tangent)

Applicable Specification: REA Specification T-8
Drawing : TH-230

Assembly complete with attaching hardware, fittings, bolts and braces.

Crossarm 3-5/8" x 9-3/8"

| <u>Manufacturer</u> | <u>Catalog No.</u> |
|---------------------------------|--------------------|
| American Crossarm & Conduit (1) | 8025V4 |
| Brooks (1,2) | 64230 |
| Cascadian (1,2) | CCC23081 |
| Hughes (1,2) | C-3338-A |
| Koppers (1) | REA-230S |
| Niedermeyer-Martin (1) | N-6720 |

Crossarm 5-1/8" x 7-1/2"

| | |
|-----------------|-----------|
| Brooks (1,2) | 64230L |
| Cascadian (1,2) | CCC230T |
| Hughes (1,2) | C-3338-AL |

1 - Fixed spacer fitting sizes as required.
2 - Adjustable spacers are available.

gz-1
July 1982

gz - Crossarm Assembly for Wishbone Construction, "Z" Type
(Single Arm)

Applicable Specification: REA Specification T-5
Applicable Drawings : REA Drawings TSZ-1 and TMZ-1

3-5/8" x 5-5/8" wood crossarm assembly complete with
brace and attaching hardware, fittings, and bolts

The following manufacturers have shown compliance with the applicable
specifications for this assembly:

| <u>Manufacturer</u> | <u>Catalog Nos. or Drawing Nos.</u> |
|------------------------------------|-------------------------------------|
| American Crossarm & Conduit Co. | 601TSZ and 602TSZ |
| Brooks Lumber | 64Z1 |
| Hughes Brothers | C-3162-A and C-3162.10 |

gz-2
July 1982

gz - Crossarm Assembly for Wishbone Construction, "Z" Type
(Double Arm)

Applicable Specification: REA Specification T-5

Applicable Drawings : REA Drawings TSZ-2 and TMZ-2

3-5/8" x 5-5/8" wood crossarm assembly complete with
brace and attaching hardware, fittings and bolts

The following manufacturers have shown compliance with the applicable
specifications for this assembly:

| <u>Manufacturer</u> | <u>Catalog Nos. or Drawing Nos.</u> |
|---------------------------------|-------------------------------------|
| American Crossarm & Conduit Co. | 602TSZ |
| Brooks Lumber (2) | 64Z2 |
| Hughes Brothers | C-3162-B and C-3162.10 |

(2) Adjustable spacers are available.

sb-1
October 1982

sb - Switch, disconnect (single-pole, hook-operated station class)

NEMA standard switches for station or line
structure use where single-pole switching is permissible

| <u>Manufacturer</u> | <u>Type</u> | <u>Voltage Ratings</u> | <u>System Voltages</u> |
|-----------------------------|-------------|---|------------------------|
| | | | <u>Line-to-Line</u> |
| ANIXTER Royal | BT | 15 thru 69 kV | 12.5 thru 69 kV |
| | BLT(PL) | 15 and 23 kV | 12.5 thru 24.9 kV |
| Bridges | EH | 15 thru 69 kV | 12.5 thru 69 kV |
| | EHL(L) | 15 thru 34.5 kV | 12.5 thru 34.5 kV |
| Brown Boveri Elec. (ITE) | HPL | 15 thru 69 kV | 12.5 thru 69 kV |
| | DS(PL) | 15 and 23 kV | 12.5, 13.2, 24.9 kV |
| Hi-Voltage (Joslyn) | HU | 15 thru 69 kV | 12.5 thru 69 kV |
| | HI | 15 thru 69 kV | 12.5 thru 69 kV |
| Johnson | HPT | 15 thru 69 kV | 12.5 thru 69 kV |
| Kearney | M-72(PL) | 15 thru 69 kV | 12.5 thru 69 kV |
| | H-72 | 15 thru 34.5 kV | 12.5 thru 34.5 kV |
| McGraw-Edison | D2(PL) | 15 and 23 kV | 12.5, 13.2, 24.9 kV |
| MEMCO | STV | 15 thru 69 kV | 12.5 thru 69 kV |
| | STU | 15 thru 69 kV | 12.5 thru 69 kV |
| Morgan | DHS | 15 thru 69 kV (PL included in 15 kV) | 12.5 thru 69 kV |
| G & W Electric Company | B-2M | 15 thru 69 kV | 12.5 thru 69 kV |
| | EV(PL) | 15 thru 34.5 kV | 12.5 thru 34.5 kV |
| S & C | LBD(PL) | 15 thru 34.5 kV | 12.5 thru 34.5 kV |
| | Alduti(L) | 15 and 25 kV | 12.5 thru 24.9 kV |
| Seeco | BT | 34.5 thru 69 kV | 34.5 thru 69 kV |
| Siemens-Allis | HA | 15 thru 69 kV | 12.5 thru 69 kV |
| | HS(PL) | 15 and 25 kV | 12.5 thru 24.9 kV |

(L) Means solid material load interrupters are available and accepted.

(LV) Means vacuum interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available.

sb - Switch, disconnect (single-pole, hook-operated station class)

NEMA standard switches for station or line structure use where single-pole switching is permissible

| <u>Manufacturer</u> | <u>Type</u> | <u>Voltage Ratings</u> | <u>System Voltages</u> <u>Line-to-Line</u> |
|---------------------|-------------|------------------------|---|
| Southern States | PBO | 15 thru 69 kV | 12.5 thru 69 kV |
| | *PBN | 15 thru 23 kV | 12.5, 13.2, 24.9 kV |
| USCO | HH(PL) | 15 thru 69 kV | 12.5 thru 69 kV |

(L) Means solid material load interrupters are available and accepted.

(LV) Means vacuum interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available.

* With steel base only.

sb - Switch, disconnect (single-pole, hook-operated distribution class)*

For distribution line use where power class insulation is not required and single-phase switching is permissible.

(Not suitable for substation use)

| <u>Manufacturer</u> | <u>Type</u> | <u>Voltage Rating</u> | <u>System Voltage Line-to-Line</u> |
|--------------------------|-------------------------------|-----------------------|------------------------------------|
| ANIXTER Royal | BLT(PL) | 15 and 23 kV | 12.5, 13.2, 24.9 kV |
| Chance | M3(PL) | 15 and 27 kV | 12.5 thru 24.9 kV |
| Brown Boveri Elec. (ITE) | DS(PL) | 15 and 23 kV | 12.5, 13.2, 24.9 kV |
| Kearney | D-73(PL) | 15 and 23 kV | 12.5, 13.2, 24.9 kV |
| McGraw-Edison | D2(PL) | 15 and 25 kV | 12.5, 13.2, 24.9 kV |
| Morgan | DHS (PL included in 15 kV) | 15 and 23 kV | 12.5, 13.2, 24.9 kV |
| G & W Electric Company | EV(PL) | 15 kV | 12.5 kV |
| S & C | LBD(PL) | 15 and 25 kV | 12.5, 13.2, 24.9 kV |
| Siemens-Allis | HD(PL) | 15 and 25 kV | 12.5 thru 24.9 kV |

NOTE: Switches on this page must be furnished with four bolts for double crossarm mounting.

(L) Means solid material load interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available.

(LV) Means vacuum interrupters are available and accepted.

*Steel bases only.

sc - Regulators, Voltage
12.5/7.2 kV
13.2/7.62 kV

Applicable Specification: REA "Specification for Substation Regulators,"
S-2

| <u>Type</u> | <u>Size</u> | <u>Description</u> |
|-------------------------|-----------------|-------------------------------------|
| <u>General Electric</u> | | |
| VR-1 | 38.1 - 509 kVA | (SL) Single phase - step type |
| MLT | 500 - 1000 kVA | (S) Three phase - step type |
| VML-32 | 500 - 833 kVA | (S) Single phase - vacuum step type |
| VMLT-32 | 1200 - 2800 kVA | (S) Three phase - vacuum step type |

| | | |
|----------------------|----------------|--|
| <u>McGraw-Edison</u> | | |
| VR-32 | 19.1 - 500 kVA | (SL) Single phase - step type |
| AB | 50 amp. | (L) Single phase - step type (Auto-Booster) |

| | | |
|----------------------|----------------|-------------------------------|
| <u>Siemens-Allis</u> | | |
| JFR | 38.1 - 667 kVA | (SL) Single phase - step type |

| | | |
|---------------------|----------------|-----------------------------|
| <u>Westinghouse</u> | | |
| UTS, UTT | 167 - 1000 kVA | (S) Three phase - step type |

(L) Indicates line use
(S) Indicates substation use

sc - Regulators, Voltage
24.9/14.4 kV

| <u>Type</u> | <u>Size</u> | <u>Description</u> |
|-------------------------|-----------------|-------------------------------------|
| <u>General Electric</u> | | |
| VR-1 | 72 - 576 kVA | (SL) Single phase - step type |
| VML-32 | 500 - 833 kVA | (S) Single phase - vacuum step type |
| VMLT-32 | 1200 - 4666 kVA | (S) Three phase - vacuum step type |

| | | |
|----------------------|--------------|--|
| <u>McGraw-Edison</u> | | |
| VR-32 | 72 - 667 kVA | (SL) Single phase - step type |
| AB | 50 amp. | (L) Single phase - step type (Auto-Booster) |

| | | |
|----------------------|----------|-------------------------------|
| <u>Siemens-Allis</u> | | |
| JFR | 72 - 833 | (SL) Single phase - step type |

(L) Indicates line use
(S) Indicates substation use

vx
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vx - Cross brace assembly, 3-3/8" x 5-3/8"
with hardware & fittings (Dwg. TM-110, REA Spec. T-7)

| <u>Manufacturer</u> | <u>Catalog No.</u> |
|--|--------------------|
| <u>American Crossarm & Conduit</u> | |
| Item 1-vx | 1100-1 |
| Item 2-vx | 1100-2 |
| <u>Hughes Bros.</u> | |
| Item 1-vx | 1042-1 |
| Item 2-vx | 1042-2 |
| <u>Brooks Lumber</u> | |
| Item 1-vx | X6685-1 |
| Item 2-vx | X6685-2 |
| <u>Joslyn</u> | |
| Item 1-vx | 1-J6046 |
| Item 2-vx | 2-J6046 |
| <u>Niedermeyer-Martin</u> | |
| Item 1-vx | N-6714-1 |
| Item 2-vx | N-6714-2 |
| <u>Cascadian</u> | |
| Item 1-vx | CCC-67-1 |
| Item 2-vx | CCC-67-2 |

Cross Brace Assembly, 3-5/8" x 7-1/2" Min.
with hardware and fittings.

Applicable Specification: T-8
Drawing: TM-110A

| <u>Manufacturer</u> | <u>Catalog No.</u> |
|-----------------------------|--------------------|
| Brooks | X-6695 |
| Hughes | 2061 A |
| American Crossarm & Conduit | 1200 |
| Joslyn | J6048 |
| Niedermeyer-Martin | N-6721 |

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TIMBER INSPECTION AGENCIES AND IDENTIFYING HAMMER STAMPS

Inspection Agencies

Hammer Stamp

Adams Engineering, Incorporated
5003 University Avenue, NE
Minneapolis, Minnesota 55421

AE

Anding Inspection Company
3105 Delwood Drive
Hattiesburg, Mississippi 39401

A in a circle

Bode Inspection Company
P. O. Box 591
Lake Oswego, Oregon 97034

B

D. A. Cole Inspection Service, Incorporated
P. O. Box 275
Hammond, Louisiana 70404

DAC

Gordon J. Daugherty Inspection Service
1985 Highway 2 East #29
Kalispell, Montana 59901

D

Froehling & Robertson, Incorporated
P. O. Box 27524
Richmond, Virginia 23261

FR

Robert W. Hunt Company
810 South Clinton Street
Chicago, Illinois 60607

H

Jason Associates, Incorporated
P. O. Box 42
Fort Collins, Colorado 80522

J

McCallum Inspection Company
P. O. Box 13266
Chesapeake, Virginia 23325

MIC

McCutchan Inspections, Incorporated
8525 N. Lombard Street
Portland, Oregon 97203

MC

CM Rou Services, Incorporated
3059 Ken Dale Drive
Mobile, Alabama 36606

CMR

SamCo Inspection & Consulting Service
3638 Honeysuckle Road
Montgomery, Alabama

SC

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TIMBER INSPECTION AGENCIES AND IDENTIFYING HAMMER STAMPS

Inspection Agencies

Hammer Stamp

Senft Inspection Service
P. O. Box 836
Ponderay, Idaho 83852

S

Southern Wood Products Inspection Company
P. O. Box 15263
Pensacola, Florida 32504

SWP in a circle

Southwestern Laboratories
P. O. Box 8768
Houston, Texas 77009

SL

Thurlow Inspection Agency
P. O. Box 123
Sandpoint, Idaho 83864

T

Timber Products Inspection
P. O. Box 919
Conyers, Georgia 30207

TP

A. W. Williams Inspection Company, Inc.
P. O. Box 2107
Mobile, Alabama 36601

AWW

zz - Poles

Pressure Treatment

| | <u>Insured Warranted</u> | <u>Independently Inspected</u> |
|---|------------------------------|---|
| Oliver Treated Products Co., Inc. | - | Hammond, La. |
| Pacific Wood Preserving | - | Cloverdale, Cal. |
| Panama Timber Co. | - | Panama, Okla. |
| Penta Wood Products, Inc. | - | Siren, Wisc. |
| Pressure Treated Timber Co. | - | Boise, Idaho |
| Selma Treating Company | - | Selma, Cal. |
| Southern Wood Piedmont Co. | - | Augusta, Ga. Baldwin, Fla. East Point, Ga. Macon, Ga. Wilmington, N. C. |
| Southeastern Wood Preserving, Inc. | - | Canton, Miss. |
| Southwest Forest Industries | Prescott, Ariz. | Prescott, Ariz. |
| Stallworth Timber Co., Inc. | - | Beatrice, Ala. Winnfield, La. |
| Standard Wood Preservers of Shreveport, Inc. | - | Shreveport, La. |
| John C. Taylor Lumber Sales, Inc. | - | Sheridan, Ore. |
| Texas Electric Cooperative, Inc. | - | Jasper, Texas |

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zz - Poles

Pressure Treatment

| | <u>Insured Warranted</u> | <u>Independently Inspected</u> |
|---|--------------------------------------|--|
| Texas Tie & Timber Co. (W. J. Smith Wood Preserving Co.) | - | Denison, Texas |
| Union Timber Corp. | - | Homerville, Ga. |
| Weekly Lumber Co. | - | Rockledge, Fla. Tampa, Fla. |
| Western Tar Products Corp. | - | Terre Haute, Ind. |
| Western Wood Preservin Co. | - | Sumner, Wash. |
| Wheeler Div., St. Regis Paper Company | Whitewood, S. D. Cass Lake, Minn. | Whitewood, S. D. Cass Lake, Minn. |
| Whitewood Post & Pole Co. | Whitewood, S. D. | Whitewood, S. D. |
| Wood Treating, Inc. | - | Picayune, Miss. |
| Wyckoff Company | - | W. Seattle, Wash. Bainbridge Island, Wash. |

U ae - Arresters, Surge
(For underground system pole risers or pad-mounted equipment)

(Shielded for Underground System Pad-mounted Equipment)

| <u>Manufacturer</u> | <u>Meeting No. and Date</u> | <u>Conditions</u> |
|---|---------------------------------|----------------------|
| <u>McGraw-Edison</u> | | |
| Metal oxide, AMOV1 U.D 10, 18 kV | 1223 11/19/81 | To obtain experience |
| <u>RTE</u> | | |
| Metal Oxide Elbow Arrestor M.O.V.E. 9, 18 kV | 1185 4/24/81 | To obtain experience |

(For Underground System Pole Risers)

| | | |
|--|-----------------|-----------------------|
| <u>General Electric</u> | | |
| Metal Oxide, Tranquell U.D 10, 18 kV | 1185 4/24/80 | To obtain experience |
| Metal Oxide, Tranquell Intermediate Class 9, 10, 18 kV | 1197 10/9/80 | To obtain experience |
| <u>McGraw-Edison</u> | | |
| Metal Oxide, AVZ1B 9/10, 18 kV | 1223 11/9/81 | To obtain experience |
| <u>Ohio Brass</u> | | |
| Metal Oxide, DynaVar VR UD 9, 10, 18 kV | 1236 6/10/82 | To obtain experience. |
| Metal Oxide, DynaVar Intermediate Class 9, 10, 18 kV | | |

U an - Transformers, distribution
pad-mounted, dead-front

(For underground application)

Applicable Specifications: "REA Specifications for Pad-Mounted
Transformers," U-5

| <u>Manufacturer</u> | <u>Single Phase</u> | <u>Three-Phase</u> |
|------------------------------------|---|----------------------------------|
| Central Moloney (2,4) | "REA-LP" 25-167 kVA | |
| Chance (2) | "Turf Hugger-R" 10-100-kVA | "Turf Hugger-R" 45-500 kVA |
| Dowzer (3,4) | "METRI-PAD" 25-167 kVA | "PM3W-R" 75-500 kVA |
| ERMCO (1) (4,6) (2,4) | "Trimline" 10-50 kVA "Low-Profile" 10-50 kVA "Low-Profile" 75 kVA | |
| General Electric (2,4) | "Mini-Pad III - REA" 10-167 kVA | "Compad II - REA" 75-2500 kVA |
| Howard (2,4) | "HiPad REA" 10-167 kVA | "HiPad 3 REA" 45-2500 kVA |
| Kuhlman (2,4) | "Lo-Pak ALR" 25-167 kVA | |
| McGraw-Edison (2,4) | Series 20/30 REA 25-167 kVA | "REA Pad-Mount" 75-2500 kVA |
| NECO (2) | HMM-R, 10-50 kVA SP-R, 75-167 kVA | TP-R, 45-1000 kVA |
| H. K. Porter (2,4) (Delta-Star) | "Low Profile U 5-R" 25-167 kVA | "Porter U5-R3" 225-2500 kVA |
| RTE (2,4) | "REA Shrubline" 15-167 kVA | "REA Terra-Tran" 45-2500 kVA |
| United (Ky. AEC) (2,4) | "Pad-Mount" 15-75 kVA | |

(1) 7.2/12.5 and 7.6/13.2 kV
(2) 7.2/12.5, 7.6/13.2 and 14.4/24.9 kV
(3) 7.2/12.5 and 7.6/13.2 kV (conditional listing for 14.4/24.9 kV)
(4) Dual voltage - same as for 14.4/24.9 kV, single phase
(5) Three-phase listing applies to 7.2/12.5 and 7.6/13.2 kV only
(6) 14.4/24.9 kV

Conditional List
U an(3)
July 1982

U an - Transformers, Distribution,
Direct Burial*

(5-25 kVA only)

Conditions: To obtain experience.

Manufacturer

Metallic Tank
(Cathodic protection
required)

Nonmetallic Tank
(Cathodic protection not
used)

Central Moloney
(Meeting 993, 6/8/72)

"Trenchmite" 15-25 kVA
Radial Feed or Loop Feed
(same end) only

Sargent-Tyee
(Meeting 1016, 5/10/73)

"No-Korrod"
10-25 kVA

*Direct burial transformers are at an early stage in their development. Large numbers of direct burial transformers should not be purchased from any one manufacturer by any one borrower in any one year. Carefull location records should be kept.

U ax
October 1982

U ax - Cutout and Arrester, Combination
for Underground System Pole Risers

| Nominal System Voltage | For 12.5Y/ 7.2 kV | For 13.2Y/ 7.6 kV | For 24.9Y/ 14.4 kV |
|-------------------------------|------------------------|-----------------------|---|
| Cutout Maximum Voltage Rating | 7.8 kV 1Ø Risers | 15 kV 3Ø Risers | 15 kV 1Ø and 3Ø ¹ Risers |
| Cutout Current Rating | 100 amps | 100 amps | 100 amps |
| Manufacturer | <u>Catalog Numbers</u> | | |
| Chance | C71D-112PB Series | C71D-112PB Series | C71D-112PB Series |
| General Electric | 9F80 | 9F80 | 9F80 |
| Joslyn | J9237-P2 | J9237-P2/R J9237-P2-R | J9267-D2 |
| McGraw-Edison | AFS300B Series | AFS300C Series | AFS300C Series |
| Southern States | CA Series | CA Series | CA Series |
| Westinghouse | 7.8LBU-II/ 10 LV | 15LBU-II/ 10 LV | 15LBU-II/ 10 LV |
| | | | 24.9LBU-II/ 18 LV |

NOTE: The units listed on this page may be used with single arresters or arresters in parallel, but must be applied in accordance with paragraph VI.A. in REA Bulletin 61-3, "Underground Rural Distribution." Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with this bulletin.

Cutouts used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

Either normal duty or heavy duty distribution class arresters listed on page ae-1 are acceptable for use with these combination units.

October 1982

U fz - Transformer Connector Block, Insulated

Multiple Cable ConnectorsWatertight - For use in all locations.

| <u>Manufacturer</u> | <u>Connection Type</u> | <u>Catalog Number</u> |
|---|-------------------------------|--|
| Utilco | Set Screw | PTF-SS, Watertight Insulated transformer Connector block |
| Burndy | Lug | Stud Mole with sealing sleeve |
| <u>Non-Watertight - For use in above grade locations only</u> | | |
| Alcoa | Lug | Interchange 1 ABBD Series (Disconnectable) Use with A9 insulating boots |
| Alcon | Set Screw | VBTT Series with double sealing sleeve |
| Electrical Spec. Prod. | Lug Lug | Type SU (Permanent) Types SUR and RDSR (Removable) (With Types LA and A1 lugs and sleeve kits) Type UPS-I (Permanent) Type UPM-I (Disconnectable) |
| Fargo | Set Screw | GUC Series GUS-200S Series |
| Homac | Bolted Set Screw | DF Series FTU 125 Series (Disconnectable) with flood seal sleeve kit UT-R Series |
| ITT | Lug Set Screw Set Screw | SCU, with lugs and sleeves TSB-J58C (Permanent) TSB-D58C (Disconnectable) |
| Penn Union | Lug Lug | Type DBAT-LH (Disconnectable) Use with Series DBTB, DBTBF and DBTH lug and sleeves kits |
| Reliable | Set Screw | 15912-REA (Disconnectable) |
| RTE | Set Screw Set Screw | Uni-Joint (Disconnectable) Uni-Joint (Permanent) |
| Utilco | Set Screw Set Screw | PTF-IN (Permanent) PTF-IN-J (Disconnectable) |

NOTE: Additional insulation may be required with some of the above-listed secondary terminal blocks due to the irregularity of mating surfaces between various secondary studs being supplied by the transformer manufacturers.

July 1982

U fz - Transformer Connector Block, Insulated
Single Cable Connectors

Non-Watertight - For use in above grade locations only

Manufacturer

Catalog Number

Electrical Spec. Prod

Type SM transformer bushing
connector kit. (Stud to
aluminum cables through
350 kcmil)

NOTE: Additional insulation may be required with some of the above-listed secondary terminal blocks due to the irregularity of mating surfaces between various secondary studs being supplied by the transformer manufacturers.

U gk - Terminations, Outdoor
(With mounting hardware)*

(When ordering specify conductor size, type, whether copper or aluminum, insulation diameter, and type of mounting desired)

| <u>Manufacturer</u> | <u>Meeting No. and Date</u> | <u>Conditions</u> |
|--|---|-----------------------|
| <u>Elastimold (ESNA)</u> | | |
| Style 16-THG (15 and 25 kV) | 921(6/26/69) | To obtain experience. |
| Style 35-MT (35 kV) | 945(6/11/70) 1098(9/23/76) | |
| <u>General Electric</u> | | |
| Termi-Matic, Type G (15, 25 and 35 kV) | 938(3/5/70) 914(3/20/69) 1083(2/5/76) | To obtain experience. |
| <u>Joslyn</u> | | |
| "Easy-On II" (15, 25 and 35 kV) | 1111 3/31/77 | To obtain experience. |
| <u>3M</u> | | |
| 5900 Series | 966 | |
| 15 kV (4/0 AWG and larger) | 5/6/71 | To obtain experience. |
| 25 kV (#2 AWG thru 750 kcmil) | 969 | |
| "Quick-Term" 5800 Series | 6/17/71 | |
| bracket mounted, | 1054 | |
| 15 kV (#2 AWG thru 3/0 AWG) | 11/27/74 | |
| MT Series | | |
| 15 kV (4/0 AWG and larger) | 1083 | |
| 25 kV, 35 kV | 2/5/76 | |
| "Quick-Term II" Series (15, 25 and 35 kV) | 1238(7/15/82) | |
| <u>ITT Blackburn</u> | | |
| Type MP (15, 25 and 35 kV) | 1043(6/13/74) 1166(6/21/79) | To obtain experience. |

*Mounting hardware is used to attach termination to mounting bracket (U hd or U hj).

Conditional List

U gk(1.2)

July 1982

U gk - Terminations, Outdoor
(With Mounting Hardware)*

(When ordering specify conductor size, type, whether copper or aluminum, insulation diameter, and type of mounting desired)

| <u>Manufacturer</u> | <u>Meeting No. and Date</u> | <u>Conditions</u> |
|--|--------------------------------------|-----------------------|
| <u>Raychem</u> Thermofit HVT (15, 25 and 35 kV) | 1054 11/27/74 | To obtain experience. |
| <u>Bishop</u> SWO Kit (15, 25 & 35 kV) | 1109 3/3/77 | To obtain experience. |
| <u>G & W</u> "Slip-on Dry" 15 kV, SD-7 25 kV, SD-8 35 kV, SD-9 | 1150(11/2/78) 1166 6/21/79 | To obtain experience. |
| <u>RTE</u> Fasterm Series (15 & 25 kV) | 1162 4/26/79 | To obtain experience. |
| <u>Sigmaform</u> Q-Cap Series STK (15 & 25 kV) | 1212 5/21/81 | To obtain experience. |

*Mounting hardware is used to attach termination to mounting bracket (U hd or U hj).

Conditional List

U he(3.1)

October 1982

U he - Enclosures, Sectionalizing Equipment
(600 amp.)

| <u>Manufacturer</u> | <u>Meeting No. and Date</u> | <u>Conditions</u> |
|---|---------------------------------|-----------------------|
| <u>RTE</u> | | |
| Type LBS, single and three phase, pad-mounted 15 kV | 1095 8/11/76 | To obtain experience. |
| <u>Joslyn</u> | | |
| Type SG6 (submersible) three-phase switching equipment, 600 amp., 15 or 25 kV | 1112 4/14/77 | To obtain experience |
| <u>Kearney</u> | | |
| <u>Series QE, QEE, QEI</u> (all with option D1) pad-mounted 15 kV, 600 amp three-phase switching and 200 amp single pole switching | 1184 4/10/80 | To obtain experience. |
| <u>Series VE</u> - pad-mounted, 15 kV and 25 kV, single phase and three-phase vacuum switching, fused or unfused 200 or 600 amps | 1184 4/10/80 | To obtain experience. |
| <u>Series VP</u> - submersible, single phase and three-phase, vacuum switching, 200 or 600 amp, 15 and 25 kV, with or without VACOP remote operator | 1184 4/10/80 | To obtain experience. |

NOTE 1: Enclosures on this page must comply with the deadfront requirements of REA Spec. U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

U hg
July 1982

U hg - Anti-tamper Shield

| <u>Manufacturer</u> | <u>Catalog No.</u> |
|---------------------|--------------------|
| Formed Plastics | 7262 Series |
| McGraw-Edison | UM8Y1 |
| Sonoco | S24 Series |

Conditional List
U hp(4)
July 1982

U hp - Terminations, Elbow
(Rated for switching on three-phase systems)

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

| <u>Manufacturer</u> | <u>Meeting No. and Date</u> | <u>Conditions</u> |
|--|---|-----------------------|
| <u>Kearney</u> 15 kV, Loadbreak with voltage test point 1115-FC Series | 1005 12/7/72 1077 11/13/75 | To obtain experience. |
| <u>RTE</u> 15 kV, Loadbreak SBT IV 2604600B Series with test point 2604599B Series without test point 25 kV, Loadbreak SBT 2604740B Series with test point 2604741B Series without test point | 1032 12/20/73 1122 9/8/77 1148 9/28/78 | To obtain experience. |
| <u>Elastimold (ESNA)</u> 15 kV, Loadbreak without voltage test point Style 165-LR 15 kV, Loadbreak with voltage test point Style 166-LR 25 kV, Loadbreak without voltage test point Style 271-LR 25 kV, Loadbreak with voltage test point Style 272-LR | 1068 6/26/75 | To obtain experience. |
| <u>General Electric</u> 15 kV, Loadbreak 9U01A--4-- Series 25 kV, Loadbreak 9U01B--5-- Series | 1133 2/16/78 | To obtain experience. |
| <u>ITT Blackburn</u> 15 kV, Loadbreak JT2B (without test point) | 1054 11/27/74 | To obtain experience. |

Conditional List

U hp(5)

October 1982

U hp - Terminations, Elbow
(Rated for switching on three-phase systems)

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

| <u>Manufacturer</u> | <u>Meeting No. and Date</u> | <u>Conditions</u> |
|------------------------------|---------------------------------|-----------------------|
| <u>Burndy</u> | | |
| 15 kV, Loadbreak | | |
| LBT112M (without test point) | 1162(4/26/79) | To obtain experience. |
| LBT112MT (with test point) | 1165(6/7/79) | |
| 25 kV, Loadbreak | | To obtain experience. |
| LBT262M (without test point) | 1240 | |
| LBT262M (with test point) | 8/12/82 | |